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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JUNE 1935

Vol. II, No. 8 (Not for publication) August 1, 1935

PUERTO RICAN INSECT PESTS OBJECTS OF SPECIAL RESEARCH

The organization for investigations on insect pests affecting agriculture in Puerto Rico, made possible by an allotment of $93,000 from the Puerto Rican Processing Tax Fund, has been completed. These studies will be headquartered at the experiment station at Mayaguez, P. R., and be handled as one general unit under the Chief of the Bureau. L. C. McAlister, Jr., who has been in charge of the Bureau's field laboratory at Mayaguez, will be in general charge of the laboratory and will act as business administrator and coordinator. The technical aspects of the work will be under the direction of the subject-matter divisions of the Bureau.

Under the immediate and general direction of the Division of Foreign Parasite Introduction, S. M. Dohanian will explore the West Indies and South America for parasites, particularly those that attack insect pests of sugarcane. K. A. Bartlett will be stationed in Puerto Rico to receive and liberate the parasites collected or sent from other laboratories of the Bureau. Under the Division of Fruit Insects, M. R. Smith will investigate coffee insects; H. K. Plank will study coconut insects; and J. W. Balock will seek new ways to control fruit flies. Under the Division of Cereal and Forage Insects, S. R. Vandenberg and F. M. Wadley will study sugarcane insect pests, especially a plant louse now thought to be a factor responsible for perpetuating certain mosaic diseases; and B. A. App will investigate corn insect pests, notably the corn ear worm. Under the Division of Truck Crop Insects, L. B. Scott will study bean insects, and, in cooperation with A. H. Madden, will also study the mole cricket. Under the Division of Cotton Insects, L. C. Fife will make a survey of cotton insects with special reference to plants other than cotton that may be infested by the pink bollworm. He will also study the flower-bud maggot, the blister mite, the cotton leaf worm, and other cotton pests. Under the Division of Insects Affecting Man and Animals, H. L. Dozier will investigate insects that attack cattle, especially the horn fly and screw worms, and G. S. Tullock will determine the distribution of mosquitoes.

FRUIT INSECT INVESTIGATIONS

Control of hickory shuck worm by plowing, preliminary results.--G. F. Moznette, in charge of the pecan-insect laboratory at Albany, Ga., reports: "Three large screen cages were used in this experiment, the first one placed over shucks containing pupae, on the surface of the ground; the second cage over soil where shucks had been plowed under to a depth of approximately 3 inches; and the third in a similar place where shucks had been buried approximately 4 inches. At the end of the emergence period the records showed that 211 moths had emerged from the shucks on the surface of the soil, 16 from the cage in which they had been buried to a depth of 3 inches, and 2 from shucks buried 4 inches deep."

Results in control of pecan nut case bearer confirmed.--C. B. Nickels, of the Brownwood, Tex., laboratory, reports that the use of two applications of lead arsenate (3 pounds in 50 gallons) alone, in combination with 1 pound of zinc sulphate, and in combination with 1/2 pint of fish oil, all reduced pecan nut case-bearer infestations more than 95 percent. Single applications reduced the infestation 75 percent or more. Experiments with nicotine sulphate 1 to 1,000, plus 0.75 percent of summer oil, a combination that has given effective control in Georgia, gave reductions in infestation averaging about 95 percent. A single application gave control nearly as effective as did two applications 10 days apart.

New host of Mediterranean fruit fly in Hawaii.--R. H. Marlowe, of the Honolulu fruit fly laboratory, has just reported that the fruit of the akee tree (Blighia sapida Kon.) is, under some conditions, heavily infested by the Mediterranean fruit fly. The fruit apparently becomes infested chiefly during the last week it is on the tree, when the practically mature fruit has opened and exposed above the black, hard seed an area of soft white flesh, which is very suitable for oviposition. As many as 40 larvae, in various instars, have been taken from one fruit.

Amylene dichlorides have value as insecticides.--O. I. Snapp and J. R. Thomson, of the Fort Valley, Ga., laboratory, have found that straight amylene dichlorides and an emulsion of amylene dichlorides at 50 percent strength are effective for the control of the lesser peach borer attacking peach trees.

Fluorine compounds injure peaches in Georgia.--Mr. Snapp reports severe injury to peaches from the use of barium fluosilicate, synthetic cryolite, and natural cryolite in three applications of concentrations as weak as 1 pound to 50 gallons of spray under the weather conditions that have prevailed this year. Many peaches were injured at the tip, where the tissue is thin over the two cellular spaces, and by May 17 a considerable drop had occurred as a result of the injury.

MEXICAN FRUIT FLY CONTROL

Fruit flies trapped in June.--Only 1 adult Anastrepha ludens Loew was trapped in Texas in June. It was taken at Laredo. Other fruit flies were trapped in Texas as follows: *A. serpentina* Wied., 15; *A. fraterculus* Wied., 10; *A.* sp. "*Y*", 1; and *A. pallens* Coq., 310. There were 1,285 larvae of *A. ludens* and *Anastrepha* species, probably *A. acidusa* Walk., taken from infested fruits from the Matamoros and Reynosa markets in Mexico.

DATE SCALE CONTROL

Results of clean-up work.--Systematic inspection in Arizona was completed in June. Only a few individual plantings near Phoenix and Yuma have yet to receive their final inspection. Ground inspection was begun in the Coachella district in the Coachella Valley. This is the last inspection of this district as a whole. If scale is not found most of the plantings will be dropped from the inspection lists. Systematic inspection was continued in the Imperial Valley during the month and no scale was found. This is the first fiscal year since the work was reorganized that scale has not been found in the Imperial Valley.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Insects as vectors of sugarcane diseases.--J. W. Ingram and W. E. Haley, Houma, La., report as follows for the period April to June 1935: "Sugarcane plants in certain fields and the grasses in and around these fields were examined at regular intervals for possible insect vectors, ants, and mosaic-diseased plants. Rusty plum aphids (*Hysteroneura setariae* Thos.) were found on *Andropogon* sp. around all fields examined in practically every examination. The corn leaf aphid (*Aphis maidis* Fitch) was found on Johnson grass (*Holcus halepensis*). This grass was not found around all fields where counts were made. Crabgrass (*Digitaria sanguinalis*) was the most common of all grasses found in sugarcane fields. It also showed mosaic disease most often. All four aphids that feed on sugarcane, *H. setariae*, *A. maidis*, *Toxoptera graminum* Rond., and *Sipha flava* Forbes, were found on it during the quarter. Mosaic disease was also observed on *Echinochloa colona* and *Panicum dichotimiflorum* in sugarcane fields during the quarter. All sugarcane aphids except *Sipha flava* were found on the last-named grass. Observations indicate that the control of mosaic grasses, especially *D. sanguinalis*, should prove one of the best means of decreasing the spread of mosaic.

Adults of Phyllophaga spp. found feeding freely on annuals.--Philip Luginbill, Lafayette, Ind., reports as follows on collections made 7 miles east of Crown Point, Ind.: "At 9 p.m. we started to make collections and continued this work until 1:30 a. m., June 16. Many beetles were taken from bur oak and hickory and some from white oak, wild plum, and other trees and shrubs. Very little mating occurred, which seemed peculiar, as there was such great activity. After 9 p.m. activity of the beetles became less and less until about midnight, when very little flying occurred. The beetles had settled down to feed and the cool, damp air made them numb. Scouting extended over plowed fields and also over fields in grain and in timothy and clover. Beetles were found feeding on weeds, occasionally only a short distance from forest trees. Narrow-leaved dock (*Rumex crispus*) seemed to be their favorite food plant. As many as 17 beetles were observed on one dock plant and from 7 to 10 beetles were common. Some of these plants were growing in a field of young corn. A 10-acre field of clover and timothy was thoroughly examined for signs of feeding. To our surprise, it was common to find feeding throughout the night on dock plants growing among the timothy and clover. The fact that May beetles feed readily on weeds may now explain why we find a rather uniform infestation of grubs in a field, the far end of which may be a great distance from a grove of trees."

Experimental wheat varieties show resistance to chinch bug.--E. T. Jones, Manhattan, Kans., reports: "Throughout a large series of wheat varieties and strains in the plots for testing hessian fly resistance at Manhattan, Kans., remarkable differences in the reaction of various varieties to chinch bug and drought injury have been noticed. Plants of varieties susceptible to chinch bugs exhibit severe stunting uniformly throughout the full length of the row, whereas the plants resistant to chinch bugs show no injury whatever and are perfectly normal in every respect. Rows of hybrids from resistant and susceptible parents show segregation for the factor of stunting from chinch bug attack."

Resistance of wheats to hessian fly.--W. B. Cartwright, Sacramento, Calif., reports that variety tests, with several new varieties of wheat added this year, were continued. Of the common wheats, American Banner, Dawson, Harvest Queen, Honor, Illini Kansas Select 223415, and Red Rock were resistant; Illini Chief, Prosperity, and Prohibition approached resistance; and the durum varieties Acme, Monad, and Pentad, were resistant.

Camnula pellucida Scudd. and Oedaleonotus enigma Scudd. in San Luis Obispo County, Calif.--C. C. Wilson, Sacramento, reports as follows on the above species: "All grasshoppers observed were in the adult stage on June 26. Oviposition was first noted on June 15, which is at least 1 month later than in the dry year of 1934. Examination of egg-bed areas indicated abandonment of such areas near cultivated crops and continued oviposition in scattered areas back in the foothills. Examination of soil gave as high as 34 egg pods per square foot, and adult populations of from 5 to 25 per square yard were observed."

Grasshopper control in San Luis Obispo County.--C. C. Wilson, Sacramento, reports that control-campaigns against grasshoppers were practically concluded after the application of 139 tons of bran on the infested area. The campaign was under the direct supervision of the agricultural commissioner's office with the aid of S. E. R. A. labor. This campaign has protected thousands of acres of cereal and forage crops, no damage being evident this year, whereas in 1934 grasshoppers caused losses of over $500,000 to cultivated crops in this county, besides doing serious damage to range grasses.

Peculiarities of homozygous resistant lines in alfalfa resistant to pea aphid.--W. B. Cartwright, Sacramento, reports as follows: "Four families that appeared to be homozygous resistant when the plants were tested in large groups were retested with only two to three plants per pot. In the second tests two plants from one family and one from another family appeared susceptible. One family continued to be almost entirely immune. The appearance of susceptible plants in homozygous resistant lines has been observed by other workers on disease resistance. This seems to indicate the delicate balance within certain plants and also to indicate modifying factors at work. Only those plants continuing to be highly resistant under all conditions will be used for seed multiplication."

Presence of several queens in nests of Atta texana Buckley affects control methods.--In his investigations of the leaf-cutter ants in the San Antonio district of Texas, E. V. Walter has discovered the following interesting facts: "The finding of several queens in a nest, as was reported in the last quarterly report, has helped immensely in solving the control problem. It is now known that the numerous queens may concentrate in a few brood chambers in the center of the nest during the winter but will spread out to more or less independent nests as the weather warms up in the spring. While these independent nests are still within the same general area and at first glance appear as one large nest, a close study will show more or less definite centers of activity, each indicating its own complete family. These are usually connected, but not always sufficiently so for a treatment applied to one nest to affect all others. In order to be sure of control it is therefore necessary to treat all of these definite centers of activity. When the results of various methods of treatment were studied, it was seen that while a few nests were killed by other materials used, carbon disulphide was the only one that could be depended on and, all things considered, was also the cheapest and easiest to use. Work was therefore concentrated on the method of using this material and on the time of year to apply the treatment. It now seems that treatment should be applied as early in the year as the weather is warm enough for the liquid to evaporate readily and before the queens leave the center of the nest to establish their own individual brood chambers. These conditions are apparently best found from late in February to the middle of April. After that time the queens are more distributed, and consequently it is necessary to treat more places and use more material. Of 99 nests treated with carbon disulphide between February 5 and April 16, 88 were killed by the first treatment, 10 required the second treatment, and 1 required the third treatment."

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Effectiveness of acid lead arsenate in different types of soil.--A study was made by W. E. Fleming and F. E. Baker, Moorestown, N. J., to determine the effectiveness of acid lead arsenate against Japanese beetle larvae in 15 representative soil types in New Jersey, as compared with its effectiveness in sassafras sandy loam. It was found that the amount of soluble ammonia, phosphorus, and magnesium in the soil were the most important factors influencing the effectiveness of acid lead arsenate. The effectiveness of acid lead arsenate is increased in soils containing high concentrations of water-soluble ammonia or phosphates and is decreased appreciably with the increase of water-soluble magnesium salts in the soil.

Determination of rotenone on foliage in the field.--Tests on this work are being conducted by R. D. Chisholm, Moorestown. The weight of rotenone in the spray residue on foliage from several plots of peach and apple trees was determined by the Gross-Smith method, using chloroform as a solvent and a leaf area of about 200 square inches. Twenty-five apple leaves and fifty peach leaves were used and the areas determined by comparison with templates of known area. Methanol and ether were tried as solvents, but both removed too much of the chlorophyll. The leaves were submerged in chloroform for 2 hours, then the extract was filtered and evaporated to dryness, after which the residue was taken up in acetone. It was found that the derris deposit is fairly constant with the several spray mixtures on the same variety of fruit. The rate of deterioration of the derris will be reported later.

FOREST INSECT INVESTIGATIONS

Compsilura concinnata Meig. established in Washington.--In 1929 the Melrose Highlands, Mass., laboratory began sending the introduced tachinid fly Compsilura concinnata to the State of Washington for liberation in satin moth infestations. R. T. Webber, who is spending this season in Washington where he is making observations on the satin moth and its natural enemies, reports that C. concinnata has been recovered from the satin moth in large numbers at Tacoma and in smaller numbers at Renton, Sumner, Puyallup, and Olympia. This is the first authentic record of the establishment of the parasite in Washington. Two other introduced European species, Apanteles solitarius Ratz. and Meteorus versicolor Wesm., which attack the satin moth and which were also sent to Washington from Melrose Highlands, were found last year to be firmly established in Washington. A. solitarius has spread rapidly and has become a very important enemy of the satin moth throughout the area infested by it.

Experiments with vector of Dutch elm disease.--In his experiments with Scolytus multistriatus Marsh. as a vector of the Dutch elm disease, W. D. Buchanan, of the Morristown, N. J., laboratory, has allowed beetles to enter disease-free elm wood after they had emerged from the same type of wood and fed on diseased elm twigs. After they had entered the disease-free wood, portions of their breeding galleries were referred to the Bureau of Plant Industry and the disease was isolated from 9 of them. In another experiment a disease-free elm log was exposed in the field and breeding galleries made by beetles that were attracted to it were also referred to the Bureau of Plant Industry. Graphium ulmi was isolated from 30 of the galleries. In comparing the results of these experiments with those obtained where beetles from diseased wood fed on the twigs of disease-free trees, Mr. Buchanan says the evidence seems to indicate strongly that infection is much more likely to occur through breeding galleries than at feeding points in twig crotches. In such cases a greater area of bark is exposed to infection, the moisture conditions are probably more favorable, and the inoculum is introduced into less resistant tissues, as these beetles usually attack only weakened material.

Woodpecker predacious on locust borer larvae.--R. C. Hall, Columbus, Ohio, reports that since the initiation of the locust borer study at Columbus in 1931 the hairy and downy woodpeckers have been observed each spring feeding on young locust borer larvae in various parts of the Central States. During the spring of 1935 they were observed on one of our locust borer study areas at Cambridge, Ohio, where on three sample plots they were responsible for the following mortality: Plot A, 48.8 percent; plot B, 42.0 percent; and plot J, 41.6 percent.

Notes on the larch case bearer.--J. V. Schaffner, Jr., of the Melrose Highlands, Mass., laboratory, reports that the permanent sample plots employed for the study of the larch case bearer were visited and observations were made on the degree of defoliation and the condition of the numbered trees. Collections of 500 cases were made at each plot for parasite recovery. The range in degree of defoliation of the trees in each plot was as follows: Berlin, N. H., 50 to 80 percent; Corinth, Maine, 80 to 95 percent; Sydney, Maine, 65 to 85 percent; Sharon, Vt., 35 to 85 percent; Lunenburg, Mass., 40 to 85 percent; North Andover, Mass., 25 to 85 percent; Stockbridge, Mass., 25 to 45 percent; Woodstock, Conn., 25 to 50 percent; Greenfield, N. Y., 15 to 50 percent; Saranac Lake, N. Y., 75 to 100 percent. Trees that have suffered severe defoliation for 2 or more years are in a more weakened condition than at the time of the establishment of the plots in 1933. At Berlin, N. H., 12 of the 32 numbered larches in the quarter-acre plot have died--1 in 1933, 4 in 1934, and 7 in 1935.

Parasites of elm leaf beetle.--P. B. Dowden and P. A. Berry, Melrose Highlands, report that 896 puparia of the tachinid Anachaetopsis nitidula Rond. were obtained from hibernating elm leaf beetle adults received last fall from H. L. Parker, Hyeres, France. The flies issued readily between June 10 and 26 in the cloth-covered emergence cages. On June 23 two colonies, each consisting of 150 males and 200 females, were prepared for transportation to New Haven, Conn., and Morristown, N. J. They were taken by automobile to these two places but unfortunately many of them died before arrival. Only 6 were alive on arrival at Morristown, whereas at New Haven 202 were liberated. The flies were placed in cloth-covered cages darkened by heavy black paper, a method employed for several years at this laboratory for transporting tachinid adults from the laboratory to the field. The reason for the high mortality is somewhat problematical but it appears that some refrigeration or cooling through moisture evaporation is necessary to insure safe transportation of certain tachinid species during the summer months. One adult, tentatively identified by Mr. Dowden as A. nitidula, was reared from elm leaf beetle adults collected at Woburn, Mass., where this parasite was liberated in 1934. This represents the first recovery of this species in America. Messrs. Dowden and Berry report the liberation of the following colonies of Tetrastichus xanthomelaenae Rond. from material received from H. L. Parker, Hyeres, France: Plainfield, N. J., 61 males and 163 females; Dunellen, N. J., 210 males and 505 females; Dunellen, N. J., 198 males and 347 females; Woburn, Mass., 325 males and 500 females; or a total of 794 males and 1,515 females.

Parasites of European pine shoot moth.--Messrs. Dowden and Berry report that four shipments of Rhyacionia buoliana Schiff. parasite material have been received from W. F. Sellers, Oberpullendorf, Austria. The species of parasites received and the emergence through June 30 is given in the following table:

Species	Material received	Emergence through June 30
Lypha dubia Fall.	3,412 puparia	--
Actia nudibasis Stein.	794 puparia	442
Copidosoma geniculatum Mayr.	100 larval skins with *C. geniculatum* pupae	189
Orgilus obscurator (Nees)	107 cocoons	--
Cremastus interruptor Grav.	104 cocoons	--
Pimpla sp.	900 pupae	85
Ephialtes examinator Fab.	124 pupal skins	41

A colony of 10,675 *Tetrastichus turionum* Hartig, a pupal parasite of the pine shoot moth, was liberated at Fairfield, Conn., on June 20.

Parasites of birch sawfly.--Parasites of the birch leaf mining sawfly (*Phyllotoma nemorata* Fall.) received last fall from Austria, have been issuing during June. The following colonies of parasites have thus far been liberated:

Locality	Species	Liberations
Eustis, Maine	*Chrysocharis laricinellae* Ratz.	500 males; 1,440 females
Do	*Chrysocharis* sp.	25 males; 150 females
Do	*Epiurus conquisitor* (Say)	50 mated females
Stark, N. H	*Chrysocharis laricinellae*	500 males; 1,220 females
North Andover, Mass	do	267 males; 238 females

About 1,200 males and 800 females of *Phanomeris phyllotomae* Muesebeck, and about 40 males and 25 females of *Tranosema pedella* Holmg. have issued through June 30. Mr. Dowden reports that a male of *Rogas unicolor* Nees, a parasite of the satin moth, was reared for the first time. The species, as previously noted, produces females from both mated and unmated stock. The male came from the egg of an unmated female.

Use of derris against willow leaf beetle and elm leaf beetle.--S. F. Potts, Melrose Highlands, reports practically 100-percent control of the imported willow leaf beetle (Plagiodera versicolora Laich.) by an application of a 1-to-500 dosage of derris with linseed oil added as an adhesive. Eggs, larvae, and adults of this beetle are easily killed by derris, but the species is very resistant to lead arsenate. The willows used in these tests were rather heavily infested with the spittle insect Aphrophora salicis DeG. and it was found that excellent control of this pest was obtained by the application of derris. Mr. Potts also reports practically complete control of elm leaf beetle adults and eggs by using 1-to-500 derris with linseed oil as a sticker. Equally good results were obtained with nicotine sulphate with a pine tar soap spreader added. In addition to controlling the elm leaf beetle, several other insects, including sawflies, beetles, gypsy moth larvae, and geometrid larvae, were killed by the derris. Later tests to control the larvae of the elm leaf beetle showed that the 1-to-500 dosage of derris gave practically complete kill. Excellent results were also obtained in killing the larvae with a 1-to-500 concentration of nicotine tannate plus linseed oil as a sticker.

Balsam woolly bark louse.--Mr. Potts reports that complete or nearly complete control of the balsam woolly bark louse (Adelges piceae Ratz.) was obtained by using lime sulphur at concentrations of 1 to 9 and 1 to 20. Good but not complete control was obtained by using 4 percent concentrations of two commercial preparations. Trees were sprayed early in the spring and thus far no injury has been observed.

Experiments with gypsy moth larvae.--W. L. Baker, Melrose Highlands, submits the following table which gives the average length of life of gypsy moth larvae in the first four instars when deprived of both food and water and when deprived of food only:

Instar	Average length of life when deprived of--	
	Both food and water	Food only
	Days	Days
First	6.40	9.90
Second	6.65	9.04
Third	4.12	4.89
Fourth	8.46	9.41

The data for fourth-instar larvae are not exactly comparable to those for the previous stages in that they were field collected, whereas the previous instars were reared in the laboratory. It is interesting to note that the absence of water decreased the average length of life from 10 percent in the fourth instar to 35 percent in the first. Mr. Baker advances the opinion that this may possibly be an explanation as to why feeding is noticeably more rapid in an environment of high temperature and low humidity. The feeding impulse is possibly stimulated by the loss of moisture, rather than from a desire to feed.

Control of spruce needle miner.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports a successful method of controlling the spruce needle miner (Taniva albolineana Kearf.) in small ornamental trees. In the spring of the year, before the leaf buds have opened, a strong stream of water is used to wash down the masses of dead needles among which the larvae are hibernating from the limbs. These needles should be washed downward so that the debris can be raked up from the base of the trees and subsequently burned or otherwise disposed of. Two seasons of testing this method seem to indicate that it is sufficiently successful to warrant its recommendation.

Control of the mountain pine beetle in Idaho.--W. D. Bedard, Coeur d'Alene, reports that the sixth season of control work against the mountain pine beetle in the white pine stand of the Coeur d'Alene National Forest was conducted during May and June. The N. I. R. A. camps of 32 men each and four C. C. C. camps were utilized in the treatment of approximately 3,000 infested trees on an area comprising 10,838 acres. During this project 7,150 C. C. C. man-days were used, which required an additional 1,100 man-days on the part of facilitating personnel employed as chief spotters, compassmen, crew foremen, and other special workers.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth control in New England and Pennsylvania.--Spraying in the barrier-zone section of New England started in Berkshire County, Mass., and in Litchfield County, Conn., on June 3. During this period 1,746 acres of woodland were sprayed in Massachusetts and 1,800 acres in Connecticut. In the Pennsylvania infested area spraying, which was begun in the latter part of May, was continued throughout June. In that State 3,970 acres of woodland, 3,080 properties in residential sections, and 3,495 isolated trees were sprayed. At a number of infestations in Massachusetts, Connecticut, and Pennsylvania burlap bands were applied to trees at infested sites that will be patrolled regularly for the purpose of killing gypsy moth larvae congregated under them. In the two New England States over 4,000 of these bands were applied and in Pennsylvania more than 75,000 bands were placed on trees. On June 30 all per diem employees on regular work were dropped but two county gypsy moth projects in Pennsylvania were not discontinued at that time. This year at many of the larger infestations the initial defoliation was not in the same spots where it occurred last year, but the following migration took the larvae back into areas completely stripped last year so that many of them have been stripped 2 years in succession. Throughout these badly infested areas numerous species of trees have suffered heavy defoliation. In addition to the most favored food plants, such as the oaks, severe defoliation has been particularly noticeable on the pines and hemlocks and also on such species as paper birch, beech, and sugar maple, which are classified as northern hardwoods and which have sometimes been considered as not being particularly favorable food for gypsy moth larvae. A list of names of men qualified for positions as foremen on gypsy moth crews was prepared at the Greenfield office and sent to the proper State officials in New Hampshire, Vermont, Massachusetts, and Connecticut. The positions for C. C. C. camps are based on the numbers of enrolled men that have been promised by the State officials for gypsy moth work. They are as follows: In New Hampshire, 220; Vermont, 1,240; Massachusetts, 1,070; Connecticut, 890. The work of applying burlap by C. C. C. camp men progressed satisfactorily. Application of burlap bands was nearly completed by the end of June and is resulting in the killing of large numbers of caterpillars at some of the infestations. Approximately 120,000 yards have been put up in Connecticut; 70,000 in Massachusetts; and 50,000 in Vermont. New men coming into the camps at the end of June resulted in some of the gypsy moth crews being brought up to their full quota so that there was an increase of men on gypsy moth work over the number thus engaged earlier in the month. The work at the burlap bands is at its height; over 800,000 caterpillars have already been crushed. The new camps which are being built and which are to be practically 100 percent gypsy moth camps are rapidly approaching completion and the men will probably be put into them within a week or two.

PLANT DISEASE CONTROL

Ribes eradication in the Inland Empire.--Ribes-eradication work in the Inland Empire is now under way with 3,878 C. C. C. members engaged in protecting the valuable white pine stands of that region from the white pine blister rust. In addition, the State of Idaho has two 30-man camps whose members are employed on this work.

C. C. C. blister rust control work in the Northeast.--An average of 2,281 enlisted men and 211 technical foremen and checkers from 81 C. C. C. camps were engaged in the eradication of Ribes in the Northeastern States during May. A total of 1,980,395 wild and 4,007 cultivated Ribes were removed by these workers from 47,821 acres, with a total of 24,929 man-days of labor. It is expected that Ribes-eradication work will be carried on this season from approximately 150 established C. C. C. camps in this region, and tentative plans have been made for such work from 19 new camps, which will probably be established in July.

Blister rust control work on Indian reservations in Wisconsin.--Approximately 90 Indians have recently been engaged in blister rust control work on the Menominee Indian Reservation. The quality of their work has been good and, considering the heavy concentrations of Ribes encountered, progress is satisfactory. On the Bad River Indian Reservation 108 Indians are employed on Ribes-eradication work to protect valuable white pine stands on that reservation.

Pine infection found in Oneida County, Wis.--T. F. Kouba, State leader in blister rust control work in Wisconsin, reports the finding of a heavy pine infection center in Oneida County. Investigation disclosed the presence of numerous Ribes cynosbati bushes within the stand, also 52 R. nigrum bushes, approximately 1/2 mile from the pine, which were later removed with the consent of the owner. No other pines within 50 miles of this infection center are known to be infected with blister rust.

Stem rust situation in the spring-wheat area as of July 10.--Rust observations made in the spring-wheat area on and immediately prior to July 10 indicated that the intensity of the stem rust epidemic in South Dakota, Minnesota, and North Dakota is increasing daily. Approximately 17 consecutive days of weather ideal for the spread of the fungus has also retarded the maturing of grains resulting in prospects for rust damage to the spring-wheat crop beyond anything experienced since 1916. Heavy damage approaching complete ruin of Marquis wheat in some areas of northeastern South Dakota, western Minnesota, and eastern North Dakota is expected. Ceres, although showing more resistance than Marquis, is rusting heavily in some areas and at least some damage is certain. On July 10 heavy rust infection had not progressed farther north than Wahpeton, N. Dak., further indicating the gradual movement of the epidemic from south to north. However, the crops in the vicinity of Fargo and north to the Canadian border are somewhat later than in southern Minnesota and eastern South Dakota, where rust is now so abundant, and, unless a change in weather retards the rapid spread of the disease, heavy rust infection may be expected throughout the Red River Valley. It is estimated that approximately 75 percent of the spring-wheat acreage in northeastern South Dakota, western Minnesota, and eastern North Dakota is planted to Ceres. Although this variety is rusting heavily in some localities, it is showing more resistance than Marquis, making an estimate of the total reduction in yield somewhat problematical.

Progress in barberry-infested areas in Iowa.--With the completion of the Public Works program in connection with barberry-eradication work in Iowa on June 30, D. R. Shepherd, in charge of the work in that State, reports that since August 1933, 3,372 square miles of territory in 33 counties have been given an intensive survey and that more than 50,000 barberry bushes were destroyed on 1,251 properties. Two hundred and eighty-four men worked a total of 16,900 man-days. Mr. Shepherd states, "Many large wild areas of barberry bushes had become established in Iowa since the first barberries were planted in the State in 1840. * * * As a general rule, the areas have been located in the heavily wooded parts of the State where the topography of the land and the dense underbrush have made thorough surveys with small crews of men practically impossible." It is in areas of this kind that the use of labor employed with Public Works funds has proved particularly valuable.

COTTON INSECT INVESTIGATIONS

Pink bollworm parasites from Hawaii received at Presidio, Tex.--L. W. Noble and W. T. Hunt, Presidio, Tex., report that a shipment of parasites forwarded from Honolulu, Hawaii, by O. C. McBride reached Presidio on June 16. In spite of the fact that this shipment was delayed en route, was shipped from San Pedro, Calif., by railway express instead of airmail, the cover or wrapping had been lost or removed, and the water placed in the cages in vials with cotton wicks had completely evaporated, some of both species of parasites shipped were still alive when they reached Presidio. When the shipment left Honolulu it consisted of 109 adults, 474 pupae, and 219 larvae of Microbracon mellitor Say and 63 adults of Chelonus blackburni Cameron. Upon arrival at Presidio approximately 100 of the 802 M. mellitor were still alive and all had reached the adult stage, and 5 of the C. blackburni--1 male and 4 females--were still alive. Sufficient oviposition to maintain breeding stock of this Hawaiian pink bollworm strain of M. mellitor was obtained and it is hoped that C. blackburni may also become established at the Presidio laboratory from the small number of individuals that reached there alive.

Microbracon hebetor Say interferes with work at the Presidio insectary.--L. W. Noble and W. T. Hunt, Presidio, report that Microbracon hebetor Say is interfering with rearing work in the laboratory. It is difficult to exclude the females of this species from host larvae parasitized by other species, Microbracon kirkpatricki Wilk. and M. brevicornis Wesm., and also from containers in which larvae of the Mediterranean flour moth are being reared for host material.

Pink bollworm parasites from Egypt reach Presidio in 16 days.--L. W. Noble and W. T. Hunt, Presidio, report concerning a shipment of pink bollworm parasites received at New York by C. P. Clausen of the Division of Foreign Parasite Introduction, and reshipped by him to Presidio. They state: "This shipment of parasites was forwarded by H. D. Smith from Giza, Egypt, on May 15 and reached Presidio on May 31. It consisted of 396 pupae of Elasmus sp. and 462 cocoons of Exeristes roborator Fab. The parcel was forwarded from New York via airplane to El Paso, Tex., and from there was taken to Presidio via automobile. No emergence occurred en route. A few of the E. roborator specimens were in the larval stage on arrival at Presidio. These and some of the pupae were placed in cold storage to be kept for later use in breeding work. About 50 pupae were allowed to complete development and emerge as adults. From these another generation is being bred, using the same breeding technique as that employed previously with the European corn borer strain of this species. At present only about 50 individuals of the generation reared at Presidio have pupated. The sex ratio of this strain seems to be better than that of the corn borer strain bred on pink bollworms. The sex ratio cannot be accurately determined, however, from the small number of individuals that have pupated thus far. The Elasmus sp. began emergence the second day after arrival at Presidio and practically 100 percent of the specimens emerged within a few days. Oviposition was obtained on pink bollworms wrapped in cotton fibers as recommended by Mr. Smith. The females also deposited eggs on worms in cotton blooms. An attempt is being made to develop a more satisfactory method for large-scale breeding. At present the method showing most promise seems to be that of allowing the females to oviposit through a coarse mesh cloth held firmly against the host larvae and confining them in a container. Oviposition has been obtained by this method, using a pint fruit jar for an oviposition cage and a stender dish for containing the host larvae, but it is believed that a larger cage and a larger container for the larvae would be more satisfactory. A second shipment of Elasmus sp. forwarded by Mr. Smith from Hyeres, France, on June 8, was received at Presidio on June 24. Only 2 adults had emerged on arrival and most of the remaining 62 pupae completed development and emerged within a few days."

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Insecticides used to control beet armyworm.--Many farmers sprayed their cotton with calcium arsenate at the rate of 8 to 10 pounds to 50 gallons of water. Observations showed that this gave some control. A test was conducted using poisoned-bran mixture when the larvae were migrating in large numbers from alfalfa stubble into cotton. The formula used was 25 pounds of bran, 1 pound of sodium arsenite, 2 quarts of molasses, and from 3 to 5 gallons of water. This mixture was applied just before dark at the rate of 10 pounds per acre. Many migrating larvae were killed, but it resulted in only a slight degree of control to larvae already on the plants. The bran dried out rapidly and was not effective for more than 2 days. Some farmers attempted to check the worms by flooding the cotton fields, entirely submerging the plants, but this was not effective, as many worms were found on the plants soon after the irrigation. Two species of parasites were obtained from the larvae of the beet armyworm--a tachinid determined by H. J. Reinhard, of the Texas Agricultural Experiment Station, as Achaetoneura archippivora Will. and a braconid determined by C. F. W. Muesebeck as Chelonus texanus Cress. During the latter part of May the larvae were found to be dying off in large numbers in the fields. This may have been due to some fungous or bacterial disease. An attempt will be made to determine the causative organism. No further injury was anticipated during this season, as the disease was proving very effective and the parasite population was rapidly increasing.

Survival and emergence of Exeristes roborator Fab.--L. W. Noble and W. T. Hunt, Presidio, report concerning the parasite Exeristes roborator Fab. that was obtained in 1932 from the corn borer laboratory at Monroe, Mich., and has been reared since then on the pink bollworm in the insectary at Presidio. For convenience this has been referred to as the corn borer strain of E. roborator Fab. Messrs. Noble and Hunt state: "A total of 318 adults emerged in hibernation cages from long-cycle larvae reared in the laboratory and placed in the cages last fall. The main purpose of the hibernation test was to determine the time and rate of emergence in the spring. The short-cycle type, or those in the pupal stage when placed in the cages, began emerging on February 11. This type, however, if breeding in the field would probably emerge before winter temperatures stopped development and therefore the adults from this type were not included in the total emergence. Emergence from the long-cycle type began on March 8 and ceased on April 25. The peak of emergence occurred about March 25. Last year no emergence was obtained after April 13. The winter mortality this year was not determined, as the number of larvae placed in the cages was not known. The mortality in tests conducted during the previous winter, however, was slightly less than 20 percent. No emergence was obtained this spring from approximately 20,000 open bolls collected after frost last fall at the point of the 1933 liberation."

Boll weevil survival in hibernation cages at Tallulah, La.--G. L. Smith et al. reported that in the 70 cages in which 35,000 boll weevils were installed during October and November 1934 there were 73 active weevils during April 1935, as compared to 1,283 in similar cages in April 1934, 49 during April 1933, and 2,788 during April 1932. Beginning on May 6 all boll weevils were removed daily from the cages as they emerged. During May and June 37 weevils emerged, or 0.11 percent, which is the lowest survival in the cages during the past 4 years.

Boll weevils fly against the wind.--At Tallulah three revolving flight screens were in operation during April, May, and June 1935. These screens move with the wind, one side always facing the wind. During this 3-month period, G. L. Smith et al. report that 10 weevils were taken on the windward side and 64 on the leeward side of the screens.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Trap-plot cotton in the Big Bend area of Texas.--The number of blooms produced in the trap-plot cotton in the Big Bend has continued to increase each week throughout June. The first blooms occurred on about the same date this year as last but, because of cool weather early in the growing season, the cotton was somewhat retarded and considerably fewer blooms were produced than last season. In the Castolon district, in Brewster County, 84,931 blooms and 7,797 pink bollworms were found during June, as compared with 163,460 blooms and 1,295 worms for the same period last year, a considerable increase in the number of worms. In the Presidio district there was also a considerable increase in the number of worms this season but not as great as in the Castolon district. For the month 36,518 blooms and 3,264 worms were collected, as compared with 64,106 blooms and 2,208 worms last season. The La Junta farm was perhaps the most heavily infested last year, and a comparison of the results for June each year is rather interesting. From one plot 3,610 blooms and 213 worms were collected in 1934, and 6,434 blooms and 756 worms this season. Another plot had 3,070 blooms and 730 worms last year as compared with 2,771 blooms and 336 worms this year. A third plot contained 3,073 blooms and 630 worms last year, as compared with 3,282 blooms and 184 worms this year, and a fourth plot had 3,789 blooms and 65 worms last year, as compared with 3,227 blooms and 35 worms this year. The above figures would seem to indicate that the infestation on the La Junta farm is perhaps lighter this year. The most interesting plot is located on the Childers farm. This farm was heavily infested in 1930 and 1931, but no cotton was planted in 1932 and 1933. Cotton was again planted in 1934, and for the month of June the trap plot showed 2,352 blooms and only 5 worms, whereas this year the plot showed 5,802 blooms and 1,505 worms. From all of the Big Bend plots 121,449 blooms and 11,061 worms were collected during June, as compared with 227,566 blooms and 3,503 worms for the same month last season. This large increase does not mean that the control program is any less efficient, but is in all probability due to seasonal fluctuation, as conditions this year must have been especially favorable for the pink bollworm. The first worms were found in the field cotton at Castolon on June 17, whereas last year worms were found in the field cotton on June 20; but very few field inspections have been made, as the plot cotton is requiring all the inspectors' time.

Pink bollworm control in Florida.--The survey for wild cotton on the east coast of Florida has been completed. The men worked as far northward as any cotton would be likely to occur. Other than the small colony located near Grant, which was previously known to exist, no wild cotton was found along the east coast. It is encouraging to know that in only a few instances were conditions found that would be at all suitable for the growth of wild cotton. Incidentally, the colony at Grant was again recleaned.

During the period June 11 to 22, a survey was made of the Bahama Islands, some 50 miles east of Florida, to determine whether or not wild cotton was present and, if so, the condition of infestation. Not all of the islands that make up this group were covered but the survey was thorough enough to determine that cotton is present and some of it is infested. All of the cotton found was of the domestic type and there were only a few plants in each location, these locations being around homes and old homesites. Pink bollworm infestation was found in the few plants present on the Berry and New Providence Islands. The elevation, character of soil, and vegetation are such that one would not expect wild cotton to be indigenous to these islands. Even though infestation is present, there is small possibility that there will be much increase, owing to the small number of cotton plants; consequently this small infestation is not likely to be a menace to the United States.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Paradichlorobenzene effective as a fumigant for seed sweetpotatoes.--K. L. Cockerham and O. T. Deen, of the Biloxi, Miss., laboratory, report that when paradichlorobenzene was used at the rate of 1 ounce for each 50 pounds of potatoes in barrels a total mortality of sweetpotato weevil larvae, pupae, and adults was obtained in 21 days. In storage banks dosages of 1½ and 1 ounces of paradichlorobenzene per 50 pounds of potatoes were required to obtain complete mortality in 21 and 28 days, respectively. In plant beds a dosage of 3 ounces per 50 pounds of potatoes gave 98.8 percent weevil mortality in 21 days. Subsequent observations of the seed potatoes used in these treatments indicated that the germination was retarded slightly, but that the number of total plants produced from the seed was not reduced.

Devil's shoestrings root effective against cabbage worms, tests indicate.--R. E. Campbell, of the Alhambra, Calif., laboratory, reports that recent tests with the finely ground root of devil's shoestrings (Cracca virginiana L.) have demonstrated that this material is very effective against the larvae of the imported cabbage worm. Samples of this material (undiluted) containing 0.17, 0.27, and 0.39 percent of rotenone, respectively, at a dosage of 1 gram per plant, gave average kills of larvae of Ascia rapae L., ranging from 89 to 94 percent, which compared favorably with results from derris root powder containing 0.2 percent of rotenone applied in the same manner and at the same dosage. Applications of the same strengths of devil's shoestrings root at a dosage of 1/2 gram per plant gave very satisfactory kills, ranging from 85 to 87.5 percent. When the same strengths were diluted with 3 parts of talc and applied at a dosage of 1 gram per plant, the percentage of A. rapae larvae killed ranged from 57.5 to 82.5 percent.

Determinations of pH on derris root powder, cube root powder, and various inert carriers give interesting results.--L. W. Brannon, of the Norfolk, Va., laboratory, reports upon pH determinations(made by Dr. J. B. Hester, soil technologist, of the Virginia Truck Experiment Station) on derris root powder, cube root powder, and various inert carriers with these organic insecticides, as follows:

Material	pH of sample
Derris root (containing 3.6 percent rotenone)	5.6
Cube root (containing 5.2 percent rotenone)	6.1
Commercial mixture A (0.55 percent rotenone) (with talc)	7.3
Commercial mixture B (0.75 percent rotenone) (with talc)	7.3
Carriers	
Clay	4.7
Tobacco dust	5.8
Diatomaceous earth	6.25
Bentonite	6.9
Infusorial earth	7.1
Talc	8.3

From the above tabulation it will be noted that the powdered derris root and cube root are acid in reaction. Also, it will be noted that all of the carriers listed, except the last two, are acid in reaction. The infusorial earth is slightly alkaline, and the talc gives a slightly higher alkaline reaction than does the infusorial earth. The literature on recommendations for the use of derris has specified that a nonalkaline or neutral or slightly acid carrier should be used, in order not to decompose the derris. Accordingly, it appears that poor control may be expected from a derris-talc mixture containing 0.75 percent rotenone. However, in the 1934 field-control experiments against the Mexican bean beetle in Virginia, this mixture gave an increase in yield of approximately 74 percent as compared with the untreated plots, and the treatment caused an increase of 85 bushels of snap beans per acre, with excellent foliage protection against the bean beetle. In this instance the derris was apparently not decomposed appreciably by the alkaline carrier (talc--pH 8.3). It is probable that decomposition is much less likely to occur in dust mixtures than in spray suspensions and, despite its alkaline reaction, talc will continue to be of no particular menace to derris or cube with which it is mixed. Apparently it is only in instances where carriers with a large alkaline reserve, such as lime, bordeaux mixtures, and soaps are used that any appreciable decomposition of the active ingredients of derris and cube may be expected.

Derris and cube about equally effective in controlling imported cabbage worm.--C. B. Wisecup and J. P. Vinzant, of the Sanford, Fla., laboratory, report that in an extensive series of laboratory tests, utilizing a precision duster, dust mixtures of derris and cube powders, respectively, containing equivalent percentages of rotenone and total extractives, proved equally effective in killing quarter-grown and half-grown larvae of the imported cabbage worm. A total of approximately 1,080 quarter-grown larvae and an equal number of half-grown larvae were used in these tests. In each of the experiments three samples of derris and three samples of cube were diluted to 0.1 percent of rotenone content for quarter-grown larvae and to 0.5 percent of rotenone for the half-grown larvae.

Derris dust the best general insecticide for cabbage worm control.--As the result of an extensive series of experimental field tests at the Baton Rouge, La., and Charleston, S. C., laboratories during the spring of 1935, C. E. Smith and W. J. Reid report that derris dusts containing from 0.5 to 1.0 percent of rotenone are equal or superior to all other materials or dilutions tested as insecticides for the control of the three major cabbage worm species present, i. e., Autographa brassicae Riley, Ascia rapae L., and Plutella maculipennis Curt.

Barium fluosilicate gives best results in control of grasshoppers in tobacco fields.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that in comparative tests with barium fluosilicate, natural cryolite (sodium fluoaluminate), derris root, and standard poisoned bait, the barium fluosilicate, diluted with tobacco dust (2-8) and dusted on the plants at the rate of 5 to 6 pounds per acre, gave the most effective results of any of the materials tested. Natural cryolite diluted with tobacco dust (2-8) and dusted on the plants at the rate of 5 to 6 pounds per acre gave approximately the same control as the standard grasshopper bait applied to the soil surface between the rows of plants at the rate of 10 pounds, dry weight, per acre. The derris dust mixture, containing 0.75 percent of rotenone with tobacco dust as a diluent, exerted very little control when dusted on the plants at the same dosage used for barium fluosilicate and natural cryolite. No burning of the foliage resulted from the application of any of the dust materials. The principal species of grasshoppers involved in these tests were Melanoplus femur-rubrum propinquus McN. and M. mexicanus Sauss.

Calcium arsenate most effective insecticide against strawberry weevil, tests show.--W. A. Thomas and L. B. Reed, of the Chadbourn, N. C., laboratory, report that in insecticide experiments directed against the strawberry weevil, calcium arsenate and dusting sulphur (1-5) proved superior to any of the other materials tested in reducing the number of weevil-cut buds, thus corroborating the results of similar experiments in previous years. Derris dust mixtures containing from 0.5 to 1 percent of rotenone, respectively, with clay as a diluent, gave fairly satisfactory results when applied to the plants after the berries began ripening. A pyrethrum dust mixture containing 0.1 percent Pyrethrin I was effective in reducing the number of weevil-cut buds, but at this strength it was inferior to the derris root powder and its present cost precludes its general use as an important insecticide for strawberry weevil control. Neither derris nor pyrethrum showed any evidence of injury to the fruit or foliage, but the calcium arsenate-sulphur dust mixture gave some evidence of foliage injury.

Promising results obtained with derris root against tobacco flea beetle.--J. U. Gilmore, of the Clarksville, Tenn., laboratory, reports that field experiments in tobacco plant beds during the present season have corroborated results obtained previously to the effect that a derris dust mixture containing 2 percent of rotenone, with tobacco dust as a diluent, gave satisfactory results in controlling the tobacco flea beetle. Paris green and arsenate of lead, though exerting a fair control, were not as effective as derris, and cryolite (sodium fluoaluminate) was less effective than either of the previously mentioned materials. On newly set tobacco, promising results were obtained with dust mixtures containing 0.55 percent of rotenone, with tobacco dust as a diluent. This material freed the plants of flea beetles within 2 hours, but the effectiveness was not as prolonged as when a dust mixture containing 2 percent of rotenone was applied.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm control measures in Southeastern States appear to be checking pest.--Because of the educational work carried on by the Bureau in the States of Georgia, Alabama, Mississippi, and Louisiana during the fall of 1934 and similar work started again this spring in these States before the fly population had had the chance to increase, the number of infested animals has apparently been kept very low. Reports from 222 counties in South Carolina, Georgia, Alabama, Mississippi, Texas, and Louisiana for the week ended June 29 show only 1,132 cases in 499,184 animals examined, and only 27 deaths. In Florida, where the fly was more or less active all winter and a large population was established before control measures were undertaken by the Bureau, 23,724 infestations occurred in 439,781 animals during the last week in June. Approximately 23,000 gallons of pine tar oil and 15,000 gallons of benzol have been distributed to the various counties in the Southeast where the campaign is being waged. Ranchmen in southwestern Texas report that screw worms are worse this season than for many years past. This area is outside the region where the present campaign is being waged.

Sulphur dips promising for control of the sheep tick and various species of sheep and goat lice.--In June O. G. Babcock, of the Sonora, Tex., laboratory, conducted experiments at the Navajo Indian Reservation, Gallup, N. Mex., to find suitable methods of controlling Melophagus ovinus L. and red lice, blue lice, and foot lice that had heavily infested the flocks belonging to Indians living on the reservation. Thylox sulphur dust and 300-mesh wettable sulphur at the rate of 10 pounds per 100 gallons of dip were used in these tests. Although final results of the tests have not been obtained, preliminary checks indicate that a high percentage of kill was effected.

Eye-gnat control work resumed in Coachella Valley, Calif.--On account of the recent severe outbreak of Hippelates pusio Loew in the Coachella Valley, the residents of this district have renewed their efforts to maintain a systematic control campaign against this pest along the lines recommended by the Bureau. Several years ago the residents of the valley organized a gnat-abatement district for the purpose of controlling the fly; however, owing to lack of funds and loss of interest probably resulting from decreased fly activity, the work had not been properly kept up. R. W. Burgess, of the Uvalde laboratory, who was sent to investigate the problem, now reports that the abatement district has been reorganized and provisions have been made to operate the gnat traps systematically during the coming year.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Five larvae of the Mediterranean fruit fly (Ceratitis capitata Wied.) were intercepted at New York on March 26 in four loquat fruits in baggage from Portugal. This fruit fly has been taken previously in loquats from the Azores and Madeira Islands. Living larvae of the West Indian sweetpotato weevil (Euscepes batatae Waterh.) arrived at Philadelphia on May 17 in a sweetpotato in stores from Puerto Rico. A living specimen of Dermestes peruvianus Casteln. was taken at San Francisco on March 18 in cacao beans in cargo from Colombia. This dermestid arrived at the same port in 1934 with hides from Argentina. A living specimen of Tenthecoris bicolor Scott was intercepted at Honolulu, T. H., on November 15, 1934, on an orchid (Cattleya schilleriana) in cargo from Brazil. A living specimen of the earwig Labia arcuata Scudd. was taken at Galveston, Tex., on April 29 with banana debris in cargo from Guatemala. This species is not recorded from the continental United States. A living specimen of Lygaeus pallidocinctus Stal arrived at Brownsville, Tex., on April 23 on a carnation flower in cargo from Mexico. A living larva of the tomato pinworm (Gnorimoschema lycopersicella Busck) was intercepted at Nogales, Ariz., on April 14 in the fruit of a bell pepper in cargo from Mexico. This represents the first record in our files of this gelechiid being intercepted in pepper. A living specimen of Pachylis hector Stal was taken at San Pedro, Calif., on March 26 on bananas in cargo from Panama. A living larva of Psylliodes chrysocephala L. was intercepted at New York on April 25 in a radish root in stores from Italy. This chrysomelid has arrived previously in brussels sprouts, carrot, rutabaga, and turnip from Europe, in turnip from Africa and the Canal Zone, and in radish from Denmark. Living specimens of the whitefly Dialeurodes chittendeni Laing were taken at Seattle, Wash., on March 18 on the leaves of a rhododendron plant in cargo from England. A living specimen of Xestocoris collinus Dist. arrived at Honolulu, T. H., on August 29, 1934, on an orchid (Stanhopea bucephalus) in cargo from the Canal Zone. A living larva of a turnip mud beetle, Helophorus rugosus Oliv. or H. porculus Bedel, was intercepted at Houston, Tex., on March 15 in a turnip in stores from England. This hydrophilid is recorded from England, Scotland, and Wales. The leaves are eaten, the leafstalks are tunneled, and the turnips are gnawed and tunneled on the outer surface. The damage is done by both beetle and grub.

Pathological interceptions of interest.--The following determinations were recorded during the month: Claviceps microcephala (Wallr.) Tulasne intercepted at Washington May 29 on Briza media from Roumania, the first time for this host and country; Colletotrichum orchidearum Allesch. at Washington on May 31 on Pleurothallis gelidanall from Dominican Republic, the first time for this host and country; Colletotrichum pisi Pat. at New York on May 9 on peas from Italy, the first from Italy (see note on p. 5 of Plant Quarantine News Letter for Dec. 1932); Helminthosporium ravenelii Curtis on April 24 at New York on Sporobolus poiretii (R&S) Hitch., the first interception from Mexico and first since 1920; Heterosporium sp. (H. allii Ell. & M.?) on April 1 at New York on onions from Chile, the first for this host and country; Monilia sp. (similar to M. sitophila) May 17 at New York on bamboo stems, origin unknown; Mycosphaerella musae (Speg.) Syd. on

June 3 at New York on banana leaves from Puerto Rico, first interception; *Nigrospora oryzae* (B. & Br.) Petch, on April 11 at New York on rice heads from French Morocco, first interception of genus; *Ophiobolus graminis* Sacc. on April 18 at New York on wheat straw from France, first interception; *Sphacelotheca panici-leucophaei* (Bref.) Clinton on April 29 at New York on *Trithacline insularis* from Puerto Rico, first interception; *Vermicularia capsici* Syd. on June 2 at Philadelphia on hot pepper from Java, the first time from Java, spores not altogether typical.

New garlic disease.--An undetermined species of *Helminthosporium* was intercepted on garlic at various ports but the specimens were inadequate for study. Finally a series of specimens was held on arrival until enough had accumulated to enable J. A. Stevenson to make a study of the fungus, which was found to have been published as *H. allii* Campanile in 1924 (Ann. Agr. Min. Econ. Naz. Italy 4:87-106). The material held was from Chile taken at New York on April 13 and May 24; from France, taken at Mobile on April 26; from Italy, taken at Mobile on April 24; and from Mexico, taken at Laredo on May 14, at New Orleans on April 17, and at New York on May 7.

Inoculated wheat intercepted.--A packet of wheat seed from Australia was found on inspection at Washington to bear spores of the flag smut fungus *Urocystis tritici* Koern. Investigation disclosed that the wheat was of a variety supposed to be free from this disease but that it had been purposely inoculated and addressed to a wheat breeder in a Pacific coast wheat area, where flag smut does not occur, for testing. The wheat was not forwarded.

Flag-smut twin intercepted.--Inspection of straw covers of bottles of cordials from Italy were found to have occasional aborted heads bearing black masses of spores which examination disclosed were similar to those of *Urocystis tritici*. A long and tedious examination by specialists in Washington revealed that the host was rye and hence the disease was stem-smut, *U. occulta* (Wallr.) Rabh., and not *U. tritici*. The two fungi cannot be separated by examination. The interception was made at Philadelphia on June 20.

Pink bollworm en route from Brazil to Texas intercepted.--Two undeclared packages in baggage from Brazil arriving at New Orleans on May 21 were found to contain cotton seed infested with nine living pink bollworm larvae. According to the passenger this cotton was grown in Brazil from Texas seed to see if the characters of the cotton remained the same under Brazilian conditions. The intercepted seed was being taken into an uninfested cotton-growing section of Texas at a time favorable for the escape and propagation of the pink bollworm.

The fleet comes in.--Arrival of the returning American fleet at San Diego necessitated the assembling of 16 inspectors from Los Angeles, the Mexican border, and intervening ports. Inspection of the 105 vessels and 193 aircraft was accomplished between noon and 7:30 p.m. Owing to the splendid cooperation of the Navy Department, only 15 small lots of overlooked material were found. These included 65 pieces of fruits and vegetables, such as cucumbers, tomatoes, sweet limes, lemons, avocados, and mangoes, and 6 pounds of string beans, all of which were Hawaiian grown. Interceptions of important insect pests included one melon fly (Bactrocera cucurbitae Coq.) and the bean pod borer (Maruca testulalis Geyer).

DOMESTIC PLANT QUARANTINES

Removal of phony peach trees from nursery zones.--Difficulties have been experienced in recent years in effecting the destruction of diseased trees in the environs of nurseries. This has been due to complications between nurserymen and neighbors, the latter failing or refusing to dig up infected peach trees from their premises. These difficulties have apparently been overcome by appealing to the good citizenship of the persons concerned, and by soliciting the influence of leading persons of the community. All the diseased trees found in the course of regular inspection this season have been removed and the owners convinced of the economic advantage of maintaining clean orchards. A disease-free zone of a mile around the nursery is a condition of State certification of peach nursery stock produced in infected counties.

Phony peach disease survey.--An extensive survey in New Jersey and Delaware was recently completed and no phony peach disease was found. A survey that will require from 2 to 3 weeks in Maryland, a State not known to be infected, has been begun by one Federal and one State inspector.

Citrus canker at Alvin, Tex.--Citrus canker infections were recently found on seven properties, including one abandoned nursery containing 3,500 Citrus trifoliata in a locality about 3 miles southeast of Alvin. More trees of this species were found in the vicinity of Alvin than in any other area in Galveston and Brazoria Counties. All the infected trees, as well as all other citrus on the properties concerned, were destroyed with the assistance of laborers paid by the State. Rapidly spreading infections on small seedlings in this locality indicate that the present season has been unusually favorable for the development of the disease.

Interesting interceptions.--Two hundred and nineteen apparent violations of Federal plant quarantines were intercepted in transit inspection in June, as well as 26 intrastate shipments moving in apparent violation of State Japanese beetle and gypsy moth quarantines. In one shipment five species of insects were discovered in a package innocently labeled "hat", consigned to a lady in Baltimore and caught at Boston by the transit inspector who found the contents to be uncertified cut roses from the gypsy moth infested area. Transit inspectors at New York recently intercepted two air-mail shipments of uncertified cut flowers originating in the area infested with the Japanese beetle and consigned to points in Missouri and Indiana. A package of grasshoppers mailed in apparent violation of the Insect Pest Act also came to the attention of New York inspectors and was referred to the appropriate division of the Bureau.

Transit inspection activities.--The inspection of mail, express, and freight shipments at Pittsburgh was initiated on May 3 by an inspector on the Japanese beetle project and that station is proving, as in previous periods worked, a strategic point for the checking of large numbers of shipments from the infested areas. At Saint Paul the cooperative inspection of foreign and domestic shipments, which was temporarily discontinued, was resumed the middle of July. Seasonal inspection at Kansas City was closed on May 20 and at Omaha on June 13.

CONTROL INVESTIGATIONS

Toxicity of arsenates of calcium depends on their water content.--J. W. Bulger, Takoma Park, Md., has determined the approximate median lethal doses for the silkworm of four pairs of arsenates of calcium of known composition. One member of each pair contained water of crystallization and the other was anhydrous or nearly so. Mono-, di-, tri-, and basic arsenates were represented. Six other pairs of arsenates of calcium were also tested, one member of each pair having been autoclaved and the other untreated. It is supposed that autoclaving drove off some of the combined water. In every one of the 12 pairs the hydrated form was more toxic than the anhydrous or heat-treated form, and in some cases no kill was obtained by the highest doses of the heat-treated forms that could be fed. N. F. Howard has already shown that autoclaving commercial calcium arsenate makes dangerous samples safe on bean foliage. It now appears that this treatment will also make such samples harmless to certain insects. An explanation for the reduction of toxicity of the arsenates of calcium by heat treatment will be sought by measuring their rates of solubility in buffered water. This project is being carried out in cooperation with the Insecticide Division.

BEE CULTURE

Measuring brood areas from photographic negatives.--A. P. Sturtevant and C. L. Farrar, of the Laramie, Wyo., laboratory, report very satisfactory results on several F. E. R. A. projects that made student help available through the University of Wyoming. One girl worked 400 hours, during which time she measured from 12 to 13 thousand negatives, about 7 thousand of which were measured a second time. Thirty-five-millimeter negatives of brood combs, made with a Leica camera, were projected so that the brood comb was half normal size. The brood areas of the projected images were measured in two ways: First, the entire area was measured with a planimeter to obtain the number of square inches of brood in all stages, i.e., eggs, larvae, and sealed brood; second, the number of square inches of sealed brood was estimated by counting the number of inches on a tracing board which covered sealed cells, accumulative estimates being made for incomplete squares.

Reports of bees lost through spray poisoning increase.--Reports of loss of bees through spray poisoning have been unusually prevalent this year. Reports of damages from the eastern part of the country have by no means been confined to fruit-growing areas. The Bronx Beekeepers' Association, in a locality where one would suppose there were no bees, found the situation so serious that it appealed to the Bureau for relief. It was found, however, that State agencies were responsible for the spraying and those in charge presumed that there would be no danger of poisoning honeybees. Arrangements are being made now to give the beekeepers' association advance notice of any

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spraying that is to be done in the future. The Somerset, Md., laboratory received a series of complaints from Shenandoah County, Va., relative to the abnormal death of adult bees. Examination of samples revealed no micro-organisms of any sort. Consequently, C. E. Burnside made a personal investigation and his conclusions were that it was another case of spray poisoning. The orchards in the vicinity are grayish-green with arsenate. The poison is always available, particularly following rains or heavy dews, when the bees seek water from the adhering droplets. Serious damage caused by bees gathering water from sprayed plants has been occurring in the potato fields of the State of Washington, and undoubtedly the same thing occurs in many apple orchards. Beekeepers are awakening to the fact that the renting of colonies to orchardists, even at fair rentals, is an unprofitable business, owing to the weakened condition of many of the colonies at the time they are moved out of the orchards. Sometimes it is impossible for such colonies to build up sufficient strength to gather a surplus crop.

More cases of plant poisoning of bees and brood reported.--Cases of abnormal death of adult bees and brood from plant poisoning appear to be increasing, now that this type of poisoning is very much under suspicion. G. H. Vansell, of the Davis, Calif., laboratory, recently investigated such a case in Orange County, Calif., where a species of Astragalus appears to be the cause of the trouble. Another species of Astragalus has recently been reported by the Provincial Apiarist of Alberta, Canada. More recently, summer titi (southern leatherwood, he-huckleberry, Cyrilla racemiflora), a plant growing in Florida, Georgia, and some of the other Southern States, appeared to be responsible for a condition known as "purple brood." C. E. Burnside, of the Somerset laboratory, and F. E. Foster, State apiary inspector of Florida, have been collaborating in tracing the cause of this abnormal condition of the brood.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A new bruchid added to the insect-reference collections.--Fragmentary specimens of beetles obtained from Cytisus proliferus from France have been placed by H. S. Barber as Bruchidius mulsanti Br., a species not previously represented in the reference collections of the National Museum. The specimens were collected at the Washington, D. C., inspection house of the Division of Foreign Plant Quarantines.

Asiatic waterlily feeder recognized.--Specimens of a moth whose larvae are reported to be very destructive to the leaves of ornamental waterlilies (Nymphaea pubescens var.), sent in by Eduardo Quisumbing, acting chief, National Museum Division, Bureau of Science, Manila, P. I., have been placed by Carl Heinrich, after correspondence with Edward Meyrick in England, as Nymphula crisonalis Walker. This species had not previously been represented in the insect-reference collections of the National Museum.

New record for Triatoma attacking man.--Specimens of a reduviid bug, identified by H. G. Barber as Triatoma uhleri Neiva, were reported to be attacking the occupants of a residence in El Paso, Tex. This represents the first record known to Mr. Barber of attacks by this species on man.

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